



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
[www.uspto.gov](http://www.uspto.gov)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/455,152	12/06/1999	SOON-CHEOL KWEON	1349.1021.MD	4703
21171	7590	03/12/2004	EXAMINER	
STAAS & HALSEY LLP SUITE 700 1201 NEW YORK AVENUE, N.W. WASHINGTON, DC 20005			TUGBANG, ANTHONY D	
			ART UNIT	PAPER NUMBER
			3729	

DATE MAILED: 03/12/2004

4

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	<b>Application No.</b>	<b>Applicant(s)</b>
	09/455,152	KWEON ET AL.
	<b>Examiner</b>	<b>Art Unit</b>
	A. Dexter Tugbang	3729

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

1) Responsive to communication(s) filed on 29 November 2001.

2a) This action is **FINAL**.                    2b) This action is non-final.

3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

4) Claim(s) 1-26 is/are pending in the application.

4a) Of the above claim(s) 20 is/are withdrawn from consideration.

5) Claim(s) 21-26 is/are allowed.

6) Claim(s) 1-8, 10-13, 15-17, 19 is/are rejected.

7) Claim(s) 9, 14 and 18 is/are objected to.

8) Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

9) The specification is objected to by the Examiner.

10) The drawing(s) filed on \_\_\_\_\_ is/are: a) accepted or b) objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11) The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

12) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a) All    b) Some \* c) None of:

1. Certified copies of the priority documents have been received.
2. Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)	4) <input type="checkbox"/> Interview Summary (PTO-413)
2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)	Paper No(s)/Mail Date. _____.
3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.	5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)
	6) <input type="checkbox"/> Other: _____.

## **DETAILED ACTION**

### ***Election/Restriction***

1. Applicant's election with traverse of the invention of Species A, Claims 1-12 and 14 in Paper No. 3 is acknowledged. The traversal is on the ground(s) that the examiner has not provided a different field of search. This is not found persuasive because as stated in the previous Office Action (Paper No. 2), Species A requires the nozzle and fluid chambers to be formed sequentially, which is not required in Species B. Species B requires the nozzles and fluid chambers to be formed simultaneously, which is not required in Species A. Species A and B are mutually exclusive, which would require non-coextensive searches, thus placing a burden on the examiner. The requirement is still deemed proper and is therefore made FINAL.
2. Claim 20 has been withdrawn from further consideration pursuant to 37 CFR 1.142(b), as being drawn to a nonelected invention, there being no allowable generic or linking claim. Applicant timely traversed the restriction (election) requirement in Paper No. 3.

### ***Specification***

3. Applicant is reminded of the proper language and format for an abstract of the disclosure.

The abstract should be in narrative form and generally limited to a single paragraph on a separate sheet within the range of 50 to 150 words. It is important that the abstract not exceed 150 words in length since the space provided for the abstract on the computer tape used by the printer is limited. The form and legal phraseology often used in patent claims, such as "means" and "said," should be avoided. The abstract should describe the disclosure sufficiently to assist readers in deciding whether there is a need for consulting the full patent text for details.

The language should be clear and concise and should not repeat information given in the title. It should avoid using phrases which can be implied, such as, "The disclosure concerns," "The disclosure defined by this invention," "The disclosure describes," etc.

Art Unit: 3729

4. The abstract of the disclosure is objected to because the abstract appears to be greater than 150 words. Correction is required. See MPEP § 608.01(b).

***Claim Objections***

5. Claims 14 and 26 are objected to because of the following informalities.

In Claim 14, the phrase of “to the separating” (line 3) should be replaced with the phrase of --to a step of--.

In Claim 26, the term “a” (line 2) should be removed.

Appropriate correction is required.

***Claim Rejections - 35 USC § 102***

6. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

7. Claims 1-5, 7, 8, 10, 11, 15-17 and 19 are rejected under 35 U.S.C. 102(b) as being

anticipated by Gibson 5,818,478.

Regarding Claim(s) 1 and 15, Gibson discloses a method of manufacturing a fluid jetting apparatus comprising: forming a heat driving part (resistors 24), a membrane (base 14) of a membrane-heat driving part assembly, and a nozzle part (nozzle plate 12, chambers 18 and nozzles 22); forming a nozzle 22 and jetting fluid chambers 18 sequentially by using one nozzle plate 12 with the nozzles and fluid chambers being formed in the one, single nozzle plate (as

Art Unit: 3729

shown in Fig. 4); and assembling or attaching the heat driving part, the membrane, and the nozzle part, together sequentially.

Regarding Claim(s) 2-5, 16, 17 and 19, Gibson further teaches laminating the nozzle plate on a substrate (“first platen” discussed at col. 3, lines 66+) in which the nozzle plate is later separated from the substrate (“first platen”); forming the nozzle 22 in the nozzle plate 12; forming the fluid jetting chambers 18 by extending the nozzle in a vertical depth direction (see Fig. 4); and abrading the nozzle plate by chemo-mechanical polishing the nozzle plate to a predetermined thickness by laser milling (see col. 4, lines 2+). It is noted that the nozzle 22 of Gibson is not considered to be formed until the openings are completely formed from one side of the plate to the other, in which this completion occurs after the step of abrading by laser milling. Thus, abrading occurs “before” the forming of the nozzle in the nozzle plate is complete.

Regarding Claim(s) 7 and 8, the claimed “lithography” is read as laser milling taught by Gibson (at col. 4, lines 2-11) that forms the nozzles 22 and the fluid chambers 18. Laser milling is equivalent to “anisotropic etching”.

Regarding Claim(s) 10 and 11, Gibson teaches forming the nozzles and fluid chamber prior to assembling the nozzle part to the membrane, where the nozzle part is fixed to the membrane by an adhesive (see col. 4, lines 28-33).

### ***Claim Rejections - 35 USC § 103***

8. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person

Art Unit: 3729

having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

9. Claims 1, 2 and 12 are rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Eldridge et al 4,792,818.

Regarding Claim(s) 1 and 2, Eldridge discloses a method of making a fluid jetting apparatus comprising: forming a heat driving part (heat delay layer 30 and passivation layer 32, membrane (passivation layer 17), and a nozzle part 33, 34, 36 (in Fig. 4); forming a nozzle 34 and jetting fluid chambers 36 sequentially by using one nozzle plate 33; assembling the heat driving part, the membrane, and the nozzle part, sequentially; where forming of the nozzle includes laminating the nozzle plate 33 on a substrate 10; forming the nozzle in the nozzle plate; and forming the jetting fluid chambers by extending the nozzle in a vertical direction (as shown in Fig. 4).

Regarding Claim(s) 12, Eldridge further teaches forming an insulated layer 13 on the substrate 10; and bonding to fix the nozzle plate 33 to the insulated layer 13.

It is noted that it is inherent that the bonding of the nozzle plate 33 to the insulated layer 13 is “anodic”, such that the two can be said to be fixed together by “anodic bonding”.

Alternatively, if the applicants’ believe that the bonding of the nozzle plate 33 to the insulated layer 13 is not inherently “anodic”, then it would have been obvious to one of ordinary skill in the art at the time the invention was made to have fixed the nozzle plate to the insulated layer of Eldridge by “anodic bonding” for the benefits of having an assembled fluid jetting apparatus operating under the thermal conditions of heat to eject ink. In Figure 4 of Eldridge, a heat bubble 37 is shown to eject ink.

10. Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over Gibson et al in view of Japanese Patent Publication JP 56-113470, referred to hereinafter as JP'470.

Gibson discloses the claimed manufacturing method as relied upon in Claims 1 and 2 above. Gibson does not appear to mention that the nozzle plate is formed from the specific material of silicon.

JP'470 suggests that nozzle plates 1 can be made of silicon.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have formed the nozzle plate of Gibson with the silicon material of JP'470, to achieve the same equivalent operating functions of ejecting ink.

11. Claim 13 is rejected under 35 U.S.C. 103(a) as being unpatentable over the combination of the Applicants' Admitted Prior Art, referred to hereinafter as the AAPA, Ikezaki et al 5,895,313, and JP'470.

The AAPA (specification, pages 1-5 and Prior Art Figures 1-4C) discloses a method of manufacturing a fluid jetting apparatus comprising: forming a heat driving part 10, membrane 20 and a nozzle part (shown in Fig. 4C); assembling the heat driving part, the membrane and the nozzle part, sequentially by laminating a nozzle plate 34 on a substrate 31; forming a nozzle 35 through lithography; forming a jetting fluid chamber 37, 38 on an area where the nozzle 35 is formed by anisotropic etching of a lithographic process; and separating the nozzle plate 34 from the substrate 31 (see sequence of Figs. 4B and 4C).

The AAPA does not teach that the nozzle plate is made of silicon and any step of abrading the nozzle plate to have a predetermined thickness by a chemo-mechanical polishing.

JP'470 suggests that nozzle plates 1 can be made of silicon.

Art Unit: 3729

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have formed the nozzle plate of the AAPA with the silicon material of JP'470, to achieve the same equivalent operating functions of ejecting ink.

Ikezaki teaches abrading a nozzle plate by a chemo-mechanical polishing process of fine particle blasting, prior to assembly (see col. 5, lines 30+), for the purpose of improving the ink discharge characteristics (see col. 5, lines 58-62).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified the method of the AAPA by including the step of abrading, as taught by Ikezaki, to advantageously improve the ink discharge characteristics of the fluid jetting apparatus.

*Allowable Subject Matter*

12. Claims 9, 14 and 18 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

13. Claims 21-26 are allowed.

*Conclusion*

14. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Art Unit: 3729

15. Any inquiry concerning this communication or earlier communications from the examiner should be directed to A. Dexter Tugbang whose telephone number is 703-308-7599. The examiner can normally be reached on Monday - Friday 7:00 am - 3:30 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Peter Vo can be reached on 703-308-1789. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



A. Dexter Tugbang  
Primary Examiner  
Art Unit 3729

March 5, 2004